

Claims

- [c1] A battery operated LED lighting apparatus comprising:
a battery outputting a battery voltage;
a light emitting diode; and
a power supply including a boost regulating circuit, said power supply in communication with said battery and said light emitting diode such that a constant voltage is supplied to said light emitting diode as said battery discharges, wherein over at least a portion of said discharge cycle said constant voltage is higher than said battery voltage.
- [c2] The battery operated LED lighting apparatus of claim 1 wherein said light emitting diode comprises a plurality of groups, said groups connected in parallel and each group of said plurality of groups comprising a plurality of light emitting diodes connected in series.
- [c3] The battery operated LED lighting apparatus of claim 2 wherein said each group further includes a ballasting device connected in series with said plurality of light emitting diodes connected in series.
- [c4] The battery operated LED lighting apparatus of claim 3

wherein said ballasting device is a resistor.

[c5] The battery operated LED lighting device of claim 1 wherein said power supply further comprises a buck regulator and wherein over a portion of said discharge cycle said battery voltage is greater than said constant voltage and said buck regulator is operative to regulate said battery voltage at said constant voltage.

[c6] A battery operated LED lighting apparatus comprising:
a battery outputting a battery voltage;
a light emitting diode;
a power supply including a boost regulating circuit, said power supply in communication with said battery to produce an output voltage to said light emitting diode such that a constant current is supplied to said light emitting diode as said battery discharges wherein over at least a portion of said discharge cycle said output voltage is higher than said battery voltage.

[c7] The battery operated LED lighting apparatus of claim 6 wherein said light emitting diode comprises a plurality of groups, said groups being connected in parallel and each group of said plurality of groups comprising a plurality of light emitting diodes connected in series.

[c8] The battery operated LED lighting apparatus of claim 7

wherein said each group further includes a ballasting device connected in series with said plurality of light emitting diodes connected in series.

[c9] The battery operated LED lighting device of claim 6 wherein said power supply further comprises a buck regulator and wherein over a portion of said discharge cycle said battery voltage is greater than said output voltage and said buck regulator is operative to regulate said battery voltage at said output voltage to produce a constant current through said light emitting diode.